School Recycling:

Increasing Diversion Rates in School and In the Home

Overview

More than seven million Californians are students, educators, or staff in educational institutions around the state. This includes more than 300 institutions of higher education, 8,000 public schools, and well over 4,000 private schools. Waste from these facilities represents approximately 2 percent or more of California's total waste stream. Schools and educational facilities can be one of the single largest waste generators in some jurisdictions.

Waste reduction, reuse, and recycling efforts have been ongoing for many years in many schools across the state. These programs help local governments meet their diversion mandates and can save school districts money. School facilities have been able to achieve diversion rates as high as 80 percent. Innovative programs are encouraging students to reduce, reuse, and recycle while using curriculum that supplements the learning process.

The benefits of this knowledge translate into greater environmental awareness in the student's home. Awareness can stimulate participation in the community's waste reduction and recycling programs and lead to increased diversion and curbside recycling.

The examples presented in this guide represent a cross-section of the state in terms of location, urbanization, length of operation, and type of program currently in place. Detailed profiles are included at the end of this model study. They represent the range of programs currently being implemented, although not all are directly operated by the local government. They include:

- Oak Grove Elementary School, Sebastopol.
- West Contra Costa County Unified School District.
- University of California, Davis.
- Loyola-Marymont University.
- Los Angeles County.

Determining Program Administration

Because schools are not directly subject to local laws and ordinances, it is difficult for local governments to control school recycling programs. As a result, local governments should consider three basic types of program administration:

- Campus or site-based programs tend to have started at the particular institution and are limited to that location. Typically they are the result of efforts put forth by an energetic individual or small group that have developed over time. The programs tend to start with one or two materials and add more as markets are developed.
- District-based programs cover multiple schools and administrative offices. These tend to start as pilot projects with limited materials or coverage and grow as the district becomes familiar with recycling and the cost benefits.
- Community-based programs are initiated by city or county staff working in close cooperation with school or district personnel. They often mirror existing recycling and waste reduction efforts and have significant hauler participation.

Since a local government may be faced with multiple school sites in multiple school districts as well as in higher education facilities, it is important to remain flexible. Some schools will have an existing recycling program in place. This may necessitate a mix of options, with some schools continuing their current program and others starting fresh.

Putting Together a Recycling Plan

School recycling plans generally consist of two primary components: operational and educational.

The operational component addresses the "how" of the school's recycling effort and the educational component addresses the "why" for students, faculty, and staff. This integrated approach appears to be the best fit for schools.

Development of the plan's components should include all potential partners to ensure success. A team approach will involve:

- Program coordinators.
- School and district administration.
- Custodial and kitchen staff.
- Students.
- Faculty.
- Waste hauler representative(s).
- Parents and community members.
- Local government staff.

Having a designated program coordinator may be helpful in both the planning and implementation stages. Fremont Unified School District has a recycling coordinator on staff because the district feels this expense is justified. The coordinator has helped to ensure a consistent program and has addressed problems that other school staff could not.

On several occasions, individual offices have produced large volumes of a single item, such as 60 boxes of white paper with carbon inserts. A local nonprofit was able to use the material, so the organization collected the material at no cost to the school.

Developing the Operational Plan Components

The operation plan needs to include a number of components:

- Sites to be served.
- Source reduction methods.
- Materials to collect and available markets.
- Level of student participation.
- Role of custodial and kitchen staff.
- Participation of haulers and recyclers.
- Reporting of diversion activities.
- Ongoing assessment/feedback plan.

Site collection and sorting operations will vary depending on space available, location, materials to be collected, and facility design. Urban schools will tend to have less space, but they will generate more materials. Materials will be generated in the classrooms, offices, cafeteria, and outdoor areas. This leads to multiple collection points and a need for school site collection operations.

Student Participation Is a Key Component

Student participation at the school site can dramatically increase diversion and decrease staff time necessary to conduct site collection. In both primary and secondary schools, students can use classroom recycling containers to separate paper, metals, plastics, and glass. The students or teachers can bring these classroom containers to collection bins for each building or to a central site location.

The level of appropriate student participation varies based on the grade level. Students in primary grades traditionally participate with direct supervision and can consolidate recyclables into the central collection points. Secondary students, while not as enthusiastic, will provide highly motivated individuals who take on leadership roles in the program. In college settings students can go even further to serve as paid program staff and volunteers.

Students can be encouraged to form an environmental/recycling club. A faculty advisor should be assigned who has an interest in the program as well as the time for supervision and guidance. Funding for the organization can come from redemption of materials such as beverage containers. The club can assist the program with collection and maintenance, publicity and events, and promoting positive peer pressure.

Student participation in collection and sorting efforts—both as volunteers and as an integrated part of classroom activities—is essential to maximizing diversion, minimizing contamination, and ensuring efficiency. It is important that students volunteer for efforts that are not directly tied to a specific classroom lesson or project. Requiring students to perform regular labor as part of the curriculum may be viewed negatively by parents and students.

Increasing individual participation and reducing contamination are critical to success. These will

require ongoing outreach and awareness building. Students can help with materials, distribution, and activities targeted for their peers. Key faculty and staff can be identified that will be willing to conduct awareness activities for their counterparts.

One of the most effective ways of building awareness is through the recycling containers. They contribute to program visibility, and they can feature material information on the bins. Another way to promote the program is by posting a central bulletin board, including program information with charts showing materials recovered and other basic information. This type of information is helpful and can bring in new community supporters as well.

Assessing the Waste Stream

The materials to be collected (and the method of collection) will vary between the primary and secondary schools. For example, secondary schools will have a higher volume of white office paper. In addition, food waste at secondary schools will appear in the common area well beyond the cafeteria.

College campuses are more like small cities with waste generation patterns varying from building to building. Waste stream analysis and collection efforts need to be tailored to the particular type of facility or grade levels served by the school.

Waste Prevention and Reuse

Source reduction is at the top of the waste management hierarchy and can have a significant impact on school waste generation. Paper reduction and changing kitchen practices are the primary areas to focus on.

Paper usage can be reduced with the following techniques, which require very little work:

- Use both sides of paper for handouts.
- Post assignments rather than hand them out.
- Keep a box for paper that can be reused on the other side.
- Keep scrap paper for displays or class projects.
- Post items directly on bulletin boards without a paper cover.
- Use laptop dry-erase or chalk pads for in-class work.
- Take notes on the back of used paper.
- Use electronic posting for agendas or minutes of meetings.
- Reuse packaging materials.
- Purchase duplex copiers.

Waste reduction efforts in the food service area are much more difficult and require working with cafeteria staff. Determining what options are practical for the school involved will be based on the grade level of the school as well as on staff and budget limitations. Options include:

- Using an “offer vs. serve” program (students may decline two of the five items offered in a reimbursable lunch).
- Providing a self-service variety bar.
- Serving some items on wax paper instead of rigid paper trays.
- Returning to reusable plastic/metal trays, flatware, and cups.
- Providing condiments and service ware in bulk.

Collection

The decision regarding which materials to collect will depend on the markets that can be developed. In a typical school waste stream (see chart on page 4) paper and organics make up close to 80 percent of the material generated. These typically have well-developed markets. Plan to collect materials for items easily marketable first, then develop recycling programs for other materials when markets become available.

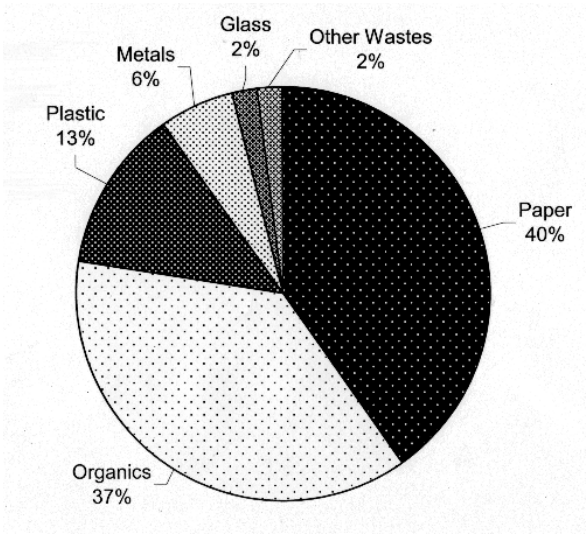
Food and Organic Wastes

Food and organic wastes are a significant portion of a school’s waste stream and present special collection concerns. The active support and involvement of custodial and kitchen staff is critical for these materials. Below are some options for handling this waste stream:

- Excess prepared food that has not reached the students can be donated to local shelters or food assistance programs located in most communities.

- Food waste collected in the cafeteria in bins can be used as feed for a local farm with hogs or other animals (hog farms must be certified by the California Department of Food and Agriculture to take food waste).
- Vermicomposting (using worms to compost) can be an excellent way to process non-dairy or meatless food waste on-site as well as provide students with hands-on science.
- Yard clippings and other landscape operations can be composted on-site or at a central facility.
- Grasscycling is an option that maintenance staff can implement that will reduce waste generation and save staff time and school funds in the course of normal operations.

Composition of Typical School Waste Stream



Source: City of Los Angeles.

Cafeteria operations can be adapted to facilitate recycling by using separate receptacles for the following items:

- Food
- Paper
- Plastics
- Beverage redemption containers
- Trash

Typically, combinations of materials are collected, such as food and paper, beverage containers, and trash.

Steps to minimize cross-contamination include educating students and staff and clearly posting what goes into each container.

The Burbank Unified School District and the City of Burbank implemented the "Waste-Less Lunch." As part of this pilot program, students sorted their lunch waste along a 12-foot counter into compostables (food and napkins), recyclables (bottles, cans, milk cartons, trays, and utensils) and landfill materials (straws, plastic wrap, food bags).

The program was designed by Kreigh Hampel and was made possible by a $2,000 grant to the Burbank Recycle Center from the League of California Cities and the California Integrated Waste Management Board (CIWMB). The program demonstrated an overall lunch waste reduction potential of 85 percent, including 72 percent compostables, 13 percent recyclables, and 15 percent landfill material.

The school discontinued the program, however, because it slowed the cleanup process. It also required too much participation by students to reduce contamination by carefully sorting their lunch in the time their lunch period allowed.

Paper Wastes

Paper waste is one of the largest components of school waste streams. Most collection efforts focus on mixed-paper collection, including newspaper, cardboard, and office paper. Collection efforts typically use smaller bins in classrooms to make recycling convenient for students and faculty. The students, faculty, or staff can transfer the materials to larger bins.

Students reduced cafeteria waste by 85 percent through Burbank's "Waste-Less Lunch" pilot program. Source: Bonnie Burrow, City of Burbank.

The City of Santa Monica started a joint program with local schools to address paper recycling. The city provides free 14-gallon collection boxes for all classrooms and administrative offices and 3-cubic-yard centralized bins that are serviced on a regular basis. The program is made available to all the local schools, public and private, including 1 junior college, 5 high schools, and 20 middle and elementary schools. Students work with the program staff to help monitor collection and keep track of the bins.

Beverage Containers

Although beverage containers are a small part of the total waste stream, they can make up a larger portion of a school's waste stream. Furthermore, containers collected under the programs of the California Beverage Container Recycling and Litter Reduction Act of 1986 (the Bottle Bill, established by AB 2020, Margolin, Chapter 1290, Statutes of 1989, and amended by subsequent recycling legislation) can become a significant source of revenue.

Oak Grove Elementary School in Sonoma County has taken the step of providing a public drop-off program for beverage containers and other recyclables at the school. This provides a convenient opportunity for families to recycle and generates additional revenue for the school.

Assessing Progress During Implementation

Monitoring progress during the implementation of a source reduction and recycling program is critical to ensure its success This will help in planning expansion of the program. Unfortunately, very few participants have made the effort to adequately monitor the progress of their programs.

One method of monitoring progress is surveying faculty, students, staff, and haulers. This can provide initial input, but face-to-face interaction with the participants will build understanding and lead to new innovations in the program.

Feedback is important to motivate participants and demonstrate progress. Posting monthly figures will keep students and staff aware of the effort and stimulate greater participation. Comment cards on the central bulletin board will also help improve operations and address concerns of contamination of recyclables, pests around bins, and institutional support.

Obtaining diversion data is essential to monitoring the efficiency of the program and recommending changes. The waste haulers and the school will have data on the collection of waste prior to the program. As the program continues, the non-recovered waste amount picked up by the hauler is easily monitored. Use this data to calculate an approximate diversion number.

The diversion figure will not show the impacts of source reduction efforts or pre-existing recycling operations. Obtaining data from weights/volumes of materials actually recycled—and reflected on transportation paperwork—is the most accurate way of measuring real diversion.

In 1997, the City of Fremont started an aggressive recycling program. The program included a strong documentation effort in nine model schools, representing 27 percent of the city's 30,500 students. The program revealed the following:

- Schools represent 2 percent of the city's waste stream.
- Approximately 50 percent of the waste stream is recyclable.
- Prior to program implementation, schools diverted 9.5 percent overall. Elementary schools diverted 11.8 percent; junior high schools, 6.6 percent; and high schools, 6.8 percent (this does not include grasscycling or other diversion).
- Model schools diverted 370 tons of recyclables during the first year, 1997–98
- Six schools recycled 34.4 tons of milk cartons, with overall projected diversion of 130 tons in 30 schools.
- Two high schools recycled 2,556 pounds of paper during a locker cleanup day.

Educating Students On the Benefits of Recycling

An educational component in a recycling and waste reduction program maximizes the efforts of students, faculty, and staff. It also ties together the source reduction and recycling efforts with class activities and leaning. Supporting the teachers and

allowing their input in the development of this component. will ensure a seamless fit.

The educational component should include:

- Teacher training.
- Curriculum.
- Classroom materials.
- Student/class participation.
- Field trips.
- Outreach/awareness.

Teacher training and curriculum go hand-in-hand. Training to use the curriculum ensures teachers have the background available in the subject. The scope of the curriculum used will vary depending on the type of program operated and materials collected.

Curriculum Materials Are Readily Available

The CIWMB offers curriculum packages and training to educators at no cost. These include:

- *Closing the Loop: Exploring Integrated Waste Management and Resource Conservation*.
- *Earth Resources—A Case Study: Oil*.
- *Municipal Solid Waste*.
- *The Worm Guide: A Vermicomposting Guide for Teachers.*

The CIWMB has staff assigned to assist local governments and schools by geographic region. Staff can provide information, contacts, and resources. They can also conduct free teacher training sessions. Teachers attending the workshop receive a complete resource package. These curricula can be incorporated into multiple subjects providing creative hands-on activities.

Educators can obtain classroom materials to teach the concept of reuse and recycling from various sources. A valuable 224-page resource guide, *Environmental Education Compendium for Integrated Waste Management and Used Oil,* is available from the CIWMB Publications Clearinghouse (see "References" on page 14) or the California Department of Education. This resource is a catalog of existing quality instructional material on integrated waste management and used oil available nationwide.

Integrating Recycling Into Classroom Activities

Resource reuse centers are a highly creative way of incorporating "reduce, reuse, recycle" into the classroom, while at the same time saving teachers money on classroom supplies. These operations, most often nonprofit groups, collect reusable materials from businesses and the community for teachers to use in the classroom on all types of projects. Teachers can add to their classroom activities, save money, and help to reduce waste. Some centers offer teacher training and project ideas.

In the County of Santa Clara, the RAFT (Resource Area for Teachers) Center accepts donations of materials from businesses and individuals. These donations are tax-deductible, and RAFT ensures that all donated materials go to established nonprofit organizations or schools.

The center is established as an independent nonprofit, which educators pay a nominal fee to access. In addition to having access to the center and supplies, they receive training on potential material uses and classroom projects. RAFT was able to divert close to 6,300 cubic yards of materials in 1999.

Student participation in class or project activities will ensure that students understand why the program's efforts matter. The lessons in biology, chemistry, and resource management will give students a picture of the "resources loop." This awareness and understanding will shape students' attitudes towards the program and their level of participation. This can result in a decrease in contamination of recyclables and an increase in the volumes recovered. Program issues are resolved quickly.

Field trips to waste transfer stations, recycling centers, materials recovery facilities, and landfills give the students dramatic visuals. Many waste haulers and waste management authorities are happy to work with schools to provide tours as staff time and operations allow. Many will have promotional and public relations materials that can be used as class resources.

Costs, Economics, and Benefits

Establishing any program takes money and effort. Up-front costs will come with new bins, staff, and

teacher training; student education and awareness activities; and administrative time to establish and manage the program. Ongoing costs of collection and sorting efforts are typically minimal compared to the savings from diversion and income realized from the recycled materials.

A number of ways exist to cover the financial costs of initial recycling efforts and program operation support. Creative partnerships with businesses, students, and members of the public are a good place to start the recycling and diversion program.

The community's waste haulers and recyclers can help establish recycling programs. Haulers can provide bins for classrooms and offices, central collection receptacles, and transportation of the recyclable materials to recycling facilities. Recyclers specializing in redemption materials and other marketable materials can be contacted regarding pickup of large volumes of materials on a regular schedule or on an as-needed basis.

In just its second year, Desert Sands Unified School District was able to save enough in avoided disposal costs to more than pay for the program's full-time staff member. The district saved an additional $57,000, which it transferred to the school discretionary budgets based upon participation. Each school received funds ranging from $1,000 to $3,000, with a high of $7,000.

School recycling is not only effective in achieving diversion, it can also be economical for the schools involved. Programs that rely upon students and teachers without requiring additional staff time should pay for themselves and result in avoided disposal costs for the school district or facility. A key to success is making sure the program is properly documented and that the waste disposal contract is based on actual volumes disposed.

La Mesa Spring Valley School District's comprehensive program has saved/earned $116,577 in one year of operation. The district operates a comprehensive program, including parents as well as other traditional school partners. In just one year, the district diverted more than190 tons of materials including more than 1,250 cubic yards of polystyrene.

Challenges and Opportunities

A key challenge in school recycling programs is maintaining motivation. Although a motivated person can get an entire program off the ground, a sustained program requires many individuals—particularly since student and parental involvement will change over time. A broad range of participation from recyclers, administrators, educators, students, custodians, and parents is critical.

Tips for Replication

- Implement the program in phases so that it may be easily changed or updated.
- Consider ways to involve students in the recycling program. Make sure the level of participation by the students is appropriate based upon their grade level.
- Monitor progress by surveying students, faculty, and staff and by tracking diversion and disposal data. This will help accommodate expansion or changes to the program.
- Developing school programs similar to the local curbside recycling program will promote greater participation at the home.

Case Study: Oak Grove Elementary School

Overview

Oak Grove Elementary School, located in Sebastopol, Calif., is part of the Oak Grove Union School District in Sonoma County. Oak Grove is a rural K–5 primary school with a population of 300 students and approximately 16 teachers. An additional seven staff members also serve Willowside Middle School.

Oak Grove's efforts are led by one dedicated individual: Fred Hall, the lead custodian. As the program has developed, the local hauler, West Sonoma County Disposal (WSC Disposal), has assisted with transportation of recyclables to other business partners in the community. Enthusiastic support from staff, students, teachers, the community, and private partners ensured the program met and exceeded expectations.

The program has been wildly successful, achieving an 80 percent diversion rate. Oak Grove has gone from generating 32 to 4 cubic yards per

month of landfill trash. The school started the program in 1992, not to save the Earth, but rather to save the school district money.

The school's recycling program has had an impact on not just students and staff, but on the community as well. "Parents say they didn't recycle much before but now they do," according to Fred Hall. Oak Grove School has not only reached its own waste reduction goals, but it has also helped the community in the process.

Program Characteristics

Prior to Mr. Hall's efforts, no recycling program existed at the school. Oak Grove began recycling by pulling cardboard, glass, and cans from regular school trash. Staff quickly found that separating commingled trash was extremely inefficient and consumed a great deal of time. It also led to contamination of the materials.

Oak Grove went in search of some new solutions. Staff developed a variety of recycling procedures and projects that Oak Grove is currently using. The programs summarized below developed over time as problems or needs arose.

Cafeteria Food. Unserved food is distributed to migrant workers, the homeless, a cancer survivor, and the after-school program. Food is boxed up after lunch and distributed by school staff. Oak Grove is solving a variety of tough recycling issues, and the school is also serving many community needs at the same time.

Drink Cartons. In the cafeteria both milk and juice cartons are separated and recycled. Oak Grove participates in a pilot program with the help of Clover (a local dairy) and WSC Disposal. The hauler comes to Oak Grove and takes the juice and milk cartons with the rest of the recyclables as needed. Empire Waste then gets the cartons from the West Sonoma County Disposal and recycles them to make paper and molded plastic products.

Yard Trimmings. Oak Grove grasscycles and maintains a compost pile for other yard wastes. This has not only cut waste and costs associated with handling and disposal of the grass clippings, it has cut maintenance costs associated with fertilization and watering. With the compost used as a soil additive, Oak Grove no longer uses synthetic fertilizers.

Mixed Recyclables. A set of four containers is placed in each room (including all classrooms) for compostable material, paper, mixed recyclables, and trash. Fourth-graders collect the containers from the rooms each day. The materials are then taken to one central point where custodial staff sorts the commingled materials.

Oak Grove Elementary School has achieved 80 percent waste diversion through strong student participation in the school's recycling program. Source: Fred Hall.

Community Drop-Off. Oak Grove accepts recyclables from individuals in the community, including parents. Oak Grove sends those recyclables to WSC. The school also accepts redemption materials from the general public and adds these to their in-house collections.

Oak Grove accepts plastic bags from students, faculty, and the community. These plastic bags go to Albertson's grocery store, then to the corporate distribution center for recycling into bags and other items by a reprocessor.

Organic Materials. Oak Grove composts paper wastes, weeds, landscape prunings, and some food wastes. The school purchased a shredder and compost bins with grant funding. Students use the compost in outdoor raised garden plots. This provides students with hands-on experience and the ability to "close the loop" on campus.

Zero Water Runoff Program. To prevent waste water from running into the nearby stream, the school absorbs or reuses all water runoff on its campus.

Oak Grove has developed an organized, efficient recycling program that covers most areas of source reduction and recycling in a school. The students are learning what can be recycled and developing the habit of recycling, and they are taking the lesson home.

Costs, Economics, and Benefits

Oak Grove has been diverting more than 7 cubic yards of waste per week. The recycling program is cost-effective for the school and has actually cut costs in associated areas. Oak Grove receives no additional funding for its program, and it requires a minimal amount of staff time. The students provide about 12 to 15 hours of volunteer labor per week. Garbage rates have been reduced by $1,400 per year. The program generated $500 in income from marketing the recycled redemption materials.

Tips for Replication

- Find a dedicated and motivated individual to initiate school recycling at a single site, but include a number of support people for ongoing operation.
- Evaluate existing programs and waste stream composition. Determining targeted materials will depend on both the school's waste stream as well as the resources available for staff and local recycling.
- Look at creative partnerships with suppliers and local businesses to reduce costs through efficient transportation of recyclables.
- Work closely with the custodial and kitchen staff members to address the types and volumes of waste and to get their input and assistance.

Case Study: West Contra Costa County

Overview

In late 1998 and early 1999, several students and staff approached the staff of West Contra Costa County Integrated Waste Management Authority regarding the establishment of recycling efforts at their schools. The authority staff, working towards meeting the requirements of the Integrated Waste Management Act (AB 939, Sher, Chapter 1095, Statutes of 1989 as amended [IWMA]), decided that a community-wide comprehensive program could be implemented.

Staff began by conducting initial research into current efforts, gathering hauler and school data, and looking for similar programs in other localities. By the spring of 1999, a draft proposal was ready to deliver to both the authority's board and the West Contra Costa Unified School District board.

The program began with the participation of both agencies during summer 1999 and began operations in the fall of that year. While the realization of increased diversion and cost savings was a goal of both agencies, the program was also developed with the goal of mirroring the existing and new community curbside programs. Mirroring the residential and school recycling programs was expected to cause a significant increase in participation through the residential program.

While data is still preliminary, the mirror effect has been successful. In one community the district began school recycling prior to residential curbside service. The curbside participation rates have been significantly higher than anticipated by the hauler and the waste management authority.

Program Characteristics

The two waste haulers servicing the district, Richmond Sanitary Service (RSS) and East Bay Sanitary Service (EBSS), supplied containers similar to the household recycling bins that are used in their curbside operations. Because two haulers serve the district, the programs are slightly customized to each area.

In schools served by RSS, a single commingled bin is used for all recyclables (paper and containers).

In schools served by EBSS, students have two bins, one for paper and the other for containers. Students place recyclables in a classroom bin(s) and then students or the teacher empty the bin into a central hallway or courtyard container. Additional bins are located outdoors for common areas of the school. The hauler then collects directly from these bins. Custodial staff deals with waste from non-classroom areas.

In secondary schools, students change classrooms every period. Recycling bins are placed in hallways outside the classrooms. In addition, a separate bin is provided for white paper collection.

In developing the program, waste management authority staff recognized that custodial staff already had many responsibilities. Accordingly, the program was established to be the responsibility of waste producers (that is, students, faculty, and other staff) and not the custodial staff.

Student involvement varies depending on the grade level. In elementary schools, it is the responsibility of the teacher to assign students to empty the classroom bin into the central bin. In secondary schools, student environmental clubs are responsible for implementing and promoting the program.

The existing program represents just the first stage of the overall program. The waste management authority's plan includes the following phases:

Phase 1—Paper and beverage containers (September 1999)

Phase 2—Review and assessment (June 2000)

Phase 3—Organics (September 2000)

Before initiating the organics program, the waste management authority staff plans to meet with school district kitchen staff to assess current food preparation and distribution methods. Recommendations will be made for reducing packaging, preventing waste, and reducing costs. The authority staff will then implement pilot programs at various schools before expanding the program districtwide.

The educational component of the program includes the following activities and support to teachers:

- Assemble curricula and resource materials.
- Coordinate a training workshop for teachers.
- Provide free worm composting kits for teachers.
- Offer free classroom presentations to teachers.
- Offer free field trips to the local recycling facilities.
- Offer free field trips to the community gardens.
- Assist and encourage faculty and students to form environmental clubs.

Costs, Economics, and Benefits

Since the program has just recently begun, neither the school district nor the waste management authority can document actual costs for the program. The school district currently spends close to $800,000 a year for garbage collection.

The goal in implementing the recycling program is to reduce garbage costs for the school district as well as to help the authority meet the 50 percent diversion goal. As a relatively new program, cost savings will not be realized until the 2000–2001 school year. Hopefully the efforts will yield a marginal reduction in garbage costs.

Tips for Replication

- The key to replicating a districtwide program is working with all the potential stakeholders and including them in the initial development and decision-making process. This will lead to greater participation and increased efficiency.
- Local haulers may be willing to participate by offering recycling containers as well as by assisting with collection and transportation of materials.

Case Study: UC Davis

Overview

The University of California at Davis is a public research institution in a suburban area. The campus covers 5,146 acres adjacent to the city of Davis. More than 24,000 students and 15,000 staff and faculty attend or work at UC Davis.

UC Davis realized its recycling potential early on. When recycling efforts began, paper was the primary focus. UC Davis has shown a strong commitment to bringing its paper recycling program to a sustainable level. Now that it is established, the same commitment is going into beverage container recycling as well. The UC Davis recycling program is known as "R4."

Program Characteristics

The R4 recycling program is an established program within the university's facilities department, but is primarily staffed with students. While the program has been successful at increasing recycling rates, the R4 program staff have undertaken a number of other activities.

The R4 program provides and implements a number of programs, procedures, and policies, including the following:

- Establishment of a toner cartridge recycling program in which all departments were given the opportunity to return the used cartridges to the central storehouse for recycling.
- UC Davis architects and engineers reduced the size of the blueprints sent to each department for review.
- The UC Davis grounds division rents a tub grinder to turn green waste into mulch.
- The UC Davis facilities services management is implementing a program to resell or recycle surplus and excess materials.

Facilities services management has standardized collection and emergency collection procedures for the campus.

To help reduce waste produced on campus, the "mini trash bin" system has been implemented as part of R4. Each office desk is supplied with a large mixed paper collection receptacle and a small mini bin trash receptacle. Although only 140 mini bins have been installed so far in the pilot program, participants have enthusiastically accepted the change. Because of the pilot program's success, R4 has a growing waiting list of departments wanting to be a part of the mini bin system.

Many other policies have also been implemented due to R4. The vice-chancellor issued a directive that recommends all campus departments purchase recycled-content paper. When a manufacturer was found selling low-quality recycled toner cartridges, R4 staff worked with the purchasing department to get a new high-quality supplier.

R4 staff also educated the campus departments about the newer higher-quality product to regain the market for recycled cartridges on campus. R4 provides educational activities and presentations about recycling to students, staff, and faculty at UC Davis.

Materials recovery estimates at UC Davis for 1999 are:

- Mixed paper: 432.7 tons.
- White paper: 17.5 tons.
- Cardboard: 205.7 tons.
- Beverage containers: 102 tons.
- Metals: 447 tons.
- Green waste: 988.4 tons.
- Total diversion: 8,857 tons.
- Total landfilled: 12,408 tons.
- Total generation: 21,265 tons.
- Overall diversion rate: 42 percent.

Plans for the future include:

- Directing the payroll department to use recycled-content envelopes with glassine windows for the thousands of paychecks and earnings statements mailed monthly.
- Placing recycling bins in every dorm room.
- Providing a newsletter to campus staff about exciting recycling developments.
- Obtaining a sorting system that would enable R4 staff to sort and bale beverage containers on campus.

Costs, Economics, and Benefits

The annual budget of the R4 program is about $150,000. The grounds, custodial, and solid waste departments fund the program out of their existing available budget. This amount is not set every year. These departments also absorb some costs on their own operations for recycling collections.

Money made annually from materials recycled comes to about $5,000–$10,000 for white paper, $20,000 for cardboard, and a minor amount from metals. Most of the other materials are given to the City of Davis.

Avoided disposal costs are estimated at $221,555 annually, or about $25 a ton. However, this cost is difficult to calculate since UC Davis operates its own landfill. UC Davis accounts for waste services on a volumetric basis as part of its direct cost agreements.

Tips for Replication

- Make sure you address contamination of materials in bins for recycling. Post labels directly on bins to clearly mark what goes in each container.
- Make sure there is a location to rinse beverage containers, or at a minimum a container to dispose of fluids.
- Hiring students as R4 staff helps to minimize costs and promote the program to the campus community.
- Shredded paper must be kept separate, since it tends to clog the R4 collection equipment.

Case Study: Loyola Marymont University

Overview

Loyola Marymont University (LMU) is located in the Westchester area of Los Angeles. With a staff of 1,400 and a student population of 7,300, the university is a major employer in the area.

The university began its recycling efforts in 1991 in response to the IWMA. Bill Stonecypher, the university's environmental control coordinator, operates LMU's recycling program. Staff has extensively studied the program. The university has achieved dramatic waste reduction and recycling accomplishments, and it is a good neighbor in the community.

According to Mr. Stonecypher, "Creating a sustainable society, it seems to me, will happen faster if first the small cities that are colleges and universities can provide enlightened examples of what could be done." With this in mind, the university has become a model for efforts to reduce waste and recycle.

Program Characteristics

The LMU program is part of the department of operations and maintenance run by a full-time staff member supported by student staff. This creates a total staff equivalent of 3.75 full-time employees.

In 1991, when the program began, LMU was disposing of 594 cubic yards of waste each week. Within just the first year the university was able to cut this amount to just 317 cubic yards per week. The initial program focused on newsprint, white paper, cans, glass, and some plastics. By spring of 1994 the program expanded to include all paper grades, all plastics, and scrap metals. These additional materials helped to cut disposal further to just 283 cubic yards per week.

Collection containers are maintained in all classrooms and offices. Larger containers are located in hallways, common areas, and other places where waste is generated. Special types of containers are located in areas that deal with food, organic, or other waste types. The student staff members conduct most of the collection operations and help promote the program.

The program also has special collection efforts for used motor oil, toner cartridges, wood, auto batteries, and appliances. Staff of the department of operations and maintenance created special containers for recycling, providing a better way of measuring recycling activity on campus.

Material collected in 1999 included:

- Cardboard: 77.49 tons.
- Newsprint: 77.45 tons.
- Scrap metal: 29.84 tons.
- Paper: 47.79 tons.
- Aluminum: 1.47 tons.
- Wood: 41.13 tons.
- Glass: 39.45 tons.
- Green waste: 214.15 tons.
- HDPE plastic: 1.17 tons.
- PET plastic: 2.88 tons.

Costs, Economics, and Benefits

One of the primary focuses of the LMU effort has been to ensure that the recycling program complements the bottom line of the university. Due to the dedicated efforts of the staff in recycling, waste reduction, recordkeeping, and accurate analysis, the program has been able to conservatively save the university more than $1.5 million in the last decade. Most of those savings were realized after the development of the program and the renegotiation of the waste hauler's contract, which took three years.

Costs to operate the program are estimated at $72,000 annually. This covers the full-time staff member as well as the student labor and other program costs. Startup costs for equipment were approximately $100,000. The use of student labor has been critical to keeping costs down.

The program benefits the environment and prolongs landfill life, and it has had positive impacts within the university. The avoided disposal costs of the program are now almost $250,000 per year. By producing more than 300 tons of saleable material, the university has turned a former liability into an asset. The exact dollar figures for funds generated by rebate material were unavailable.

Tips for Replication

- Negotiate contract provisions with the waste hauler that will support an effective recycling program.
- Allow flexibility in pickup locations and avoid being restricted to an existing trash-focused design.
- Negotiate billing contracts for waste services based upon the actual weight or volume of materials picked up for disposal. Contracts without this will not yield the potential savings from avoided disposal costs realized by reduction and recycling efforts.

Case Study: Los Angeles County

Overview

The Los Angeles County Department of Public Works coordinates educational programs for local schools through the "Environmental Defenders" (elementary schools) and "Generation Earth" (secondary schools) programs.

During the past three years, Generation Earth has been on the cutting edge of creating exciting and innovative educational opportunities for secondary students and teachers in Los Angeles County. The program is operated by TreePeople, a nonprofit organization in the Los Angeles area.

The program provides a variety of resources to local schools, including:

- Student action kits.
- Teacher's action guide.
- Annual teacher summit.
- Field studies.
- Radio promotion on KISS-FM and Power 106.
- Toll-free hotline: 1-888-3UP-2YOU.
- Community events and youth conferences.

In 1997, the "Battle of the Schools" competition was initiated as an education element of the Generation Earth program. Thirty-six schools participated in the first year.

The winning school, Stephens Middle School, reduced disposal by more than 16 bins a month, from 64 to 48 bins per month. Through the program, Stephens now has an established glass, plastic, and aluminum recycling program along with a paper recovery program.

During the competition, Stephens Middle School recovered more than 5 tons of materials. In addition, Stephens is in the process of implementing a new plan to further reduce waste. The school plans to replace the disposable food trays with washable metal or plastic trays.

Program Characteristics

The competition began with a campaign on a local radio station (KISS-FM) that was a co-sponsor of the event. The messages aired from October 25th through December 3rd. The contest was completed on December 17, 1999, to allow for final computation of all school events.

Educational messages were designed to encourage listeners to call the station's hotline for more information about the competition. The station received numerous calls from students, parents, teachers, and principals requesting a "Campus Waste Stream Reduction Kit" and asking how to participate in the "Battle of the Schools" competition.

Generation Earth staff made phone calls and sent faxes to teachers and school administrators from a list of previous campaigns such as teachers summits and "Rock the Earth." As a result of the combined efforts, more than 70 schools requested waste stream reduction kits for the Battle of the Schools competition.

Up to now, the program has focused on public education as a way of increasing recycling efforts, but it has not quantified those efforts other than noting the number of schools that participated in the competition. The county will be working in the

near future to begin quantifying diversion in order to show the impact of the education efforts on recycling.

Challenges and Opportunities

A challenge in implementing a school recycling program is including those responsible for maintaining the facilities. Without their cooperation, programs will fail or last for only a short period of time. One of the keys behind Stephens Middle School's success is that they included facility personnel from the start.

Another possible obstacle that may arise when dealing with a school is the district purchasing policy that may have been in place for some time. In some cases districts have placed orders for materials years in advance. Individual schools that are allowed more autonomy in making purchasing decisions—such as buying recycled products and electing local service providers and recyclers—also benefit the waste reduction and materials recovery programs.

Obtaining strong student participation presents a good opportunity for program success. Student participants must understand the operational aspects of school recycling programs, including:

- Use of materials.
- Packaging reduction.
- Production and recycling of classroom waste.
- Recycling bins and disposal containers.
- Transportation of materials.
- The types of products created by recovered materials.

As students feel an increased ownership in the program, participation increases and critical thinking skills are encouraged.

Tips for Replication

- Involve a whole group of participants. Do not rely on one or two people. The larger the group, the more the participants will challenge themselves.
- Keep the program simple.
- Be sure to include facilities personnel.
- Have a hook such as music to get students' attention and to keep them interested.
- Allow students to fully utilize their skills and abilities. Do not do it for them.

References

CIWMB Publications

Many CIWMB publications are available on the Board's Web site at: www.ciwmb.ca.gov/Publications/.

To order hard copy publications, call 1-800-CA-Waste (California only) or (916) 341-6306, or write:

California Integrated Waste Management Board
Public Affairs Office,
Publications Clearinghouse (MS-6)
1001 I Street
P.O. Box 4025 (mailing address)
Sacramento, CA 95812-4025

Environment Matters is an online newsletter about school-related developments at the California Integrated Waste Management Board. It is available on the CIWMB Web site at www.ciwmb.ca.gov/Schools/Newsletter/.

Contacts

CIWMB Contacts

For more information about local government recycling models or school recycling, contact the Office of Local Assistance at (916) 341-6199. Also see www.ciwmb.ca.gov/OLA/Contacts.htm and www.ciwmb.ca.gov/Schools/Contacts/

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Credits and Disclaimer

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The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, Flex Your Power and visit www.consumerenergycenter.org/flex/index.html.

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